

6/28/01

CURRICULUM VITAE

1. PERSONAL

NAME: Helen Elizabeth Gruber, Ph.D.
BIRTHDATE: November 6, 1946
BIRTHPLACE: Wallace, Idaho
CITIZENSHIP: U.S.A.
SOCIAL SECURITY NUMBER: 519-58-0241
BUSINESS ADDRESS: Orthopaedic Research Biology
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MARITAL STATUS: Single

2. EDUCATION AND TRAINING

UNDERGRADUATE: University of Idaho; Moscow, Idaho;
B.S., Pre-Med; 1969

GRADUATE: Oregon State University; Corvallis, Oregon;
M.S.; 1974; Cell Biology, Radiation Biology, Microbiology

Oregon State University; Corvallis, Oregon; Ph.D.; 1976; Cell
Biology, Radiation Biology, Zoology

3. POSTDOCTORAL TRAINING

NIH Fellow; Radiation Research Lab, University of Iowa; Iowa City, Iowa; 1976-1978

4. MILITARY SERVICE: None

5. ACADEMIC APPOINTMENTS

June 1999 – present	Faculty member, Interdisciplinary PhD in Biology program, Univ. N.C. Charlotte
Aug 1997 - Present	Adjunct Professor, Greenville Hospital System/Clemson University Biomedical Cooperative, Clemson, S.C.
July 1994- June 2002	Graduate Faculty appointment, University of North Carolina at Charlotte, Charlotte, North Carolina
March 1994- present	Adjunct Professor, Department of Biology, University of North Carolina at Charlotte, Charlotte, North Carolina

January 1994-present	Senior Scientist and Director of Research Histology Baxter Orthopaedic Research Laboratory Department of Orthopaedic Surgery Carolinas Medical Center, Charlotte, North Carolina
July 1991-November 1993	Research Scientist III Cedars-Sinai Medical Center Los Angeles, California
July 1991-November 1993	Associate Researcher II, Department of Pediatrics University of California at Los Angeles Los Angeles, California
July 1991-November 1993	Associate Faculty UCLA Intercampus Medical Genetics Training Program
July 1989-1991	Associate Researcher I, Department of Pediatrics University of California at Los Angeles Los Angeles, California
1986-1991	Research Scientist II and Director, Skeletal Dysplasia Morphology Laboratory; Department of Pediatrics and Medical Genetics Birth Defects Center, Cedars-Sinai Medical Center Los Angeles, California
1986-1989	Assistant Researcher IV, Department of Pediatrics University of California at Los Angeles Los Angeles, California
1984-1986	Assistant Professor of Research Medicine University of Southern California School of Medicine Department of Medicine, Division of Nephrology Los Angeles, California
1981-1984	Research Fellow, University of Southern California School of Medicine, Division of Nephrology Los Angeles, California (Dr. Shaul G. Massry)
1978-1981	Research Instructor of Medicine University of Washington Stationed at V.A. Medical Center, Tacoma, Washington (Dr. David J. Baylink)
1976-1978	Postdoctoral Fellow, Radiation Research Lab, University of Iowa, Iowa City, Iowa (Dr. J.W. Osborne, advisor)
1974-1976	Research Assistant, Oregon State University Corvallis, Oregon (Dr. David L. Willis, supervisor)
1972-1973	Northwest College and University Association for Science Fellow, Battelle Northwest Laboratories, Richland, Washington (Ph.D. Research conducted under Dr. James C. Hampton)

1970-1972, 1973 Teaching Assistant, General Biology, Department of
General Science, Oregon State University, and
Teaching Assistant in Cellular Radiation Biology, Oregon State
University

6. HONORS

- 1984 Listed in Who's Who in Frontier Science and Technology, 1st Ed.
- 1985 Invited Speaker, International Symposium on Magnesium and its Relationship to Cardiovascular, Renal and Metabolic Disorders, February 14, 1985, Workshop on Magnesium and Bone Disorders
- 1986 Appreciation Award, Volunteer Teaching, Griffin Avenue School, Los Angeles, California, June 18, 1986
- 1988 Appreciation Award, Volunteer Teaching, Griffin Avenue School, Los Angeles, California, June 20, 1988
- 1989 Recipient of Departmental Tribute for Distinguished Service, Department of Physical Therapy, University of Southern California, May 1989
- 1989-1990 Ad Hoc Reviewer for Veterans Administration Merit Review Board for Endocrinology
- 1990 Listed in Who's Who of American Women, 17th Ed.
- 1994 Listed in Who's Who in the West, 23rd Ed., in press
- 1997-98 Listed in Who's Who in the South and Southwest, 25th edition
- 1999-2000 Listed in Who's Who in the South and Southwest, 26th edition, 1999-2000
- 1998-99 Honored Member, Strathmore's Who's Who
- 1999 Host mentor laboratory, "Implantation methodologies for autologous disc cell therapy". Alpha Omega Alpha Honor Medical Society - funded Student Research Fellowship for David Martin, summer, 1998.

7. PUBLIC AND COMMUNITY SERVICE ACTIVITY

- 1986 Appreciation Award, Volunteer Teaching, Griffin Avenue School, Los Angeles, California, June 18, 1986
- 1988 Appreciation Award, Volunteer Teaching, Griffin Avenue School, Los Angeles, California, June 20, 1988
- 1990 Volunteer Teacher, Griffin Avenue School, Los Angeles, California
- 1993 Host laboratory for summer student in NIH-funded Minority High School Student Research Apprenticeship Program, Modoupe Akinloye, (worked on histology cartilage project July-August 1993)

- 1994. Host laboratory and supervisor for Scientist-Teacher-Exchange-Program for local high school science teacher Sharron Mottsinger, July-August
- 1995 Host laboratory and supervisor for teacher Angela Ireland. NIH-funded "Precollege Research Opportunities for Minorities in Health Science Education", A. Harver, UNCC, P.I.
- 1995 Science Fair Judge, Holy Trinity Catholic Middle School, Charlotte, N.C. 12/9/95

8. **MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES**

American Association for the Advancement of Science

American Federation for Medical Research

American Society for Bone and Mineral Research

American Society for Cell Biology

Society for Experimental Biology and Medicine

Society for Diagnostic Ultrastructural Pathology

Society for Quantitative Morphology

Electron Microscopy Society of America

International Society for Stereology

Orthopaedic Research Society

International Society for Molecular Morphology

9. **ACADEMIC AND PROFESSIONAL APPOINTMENTS/COMMITTEES**

A. **GRADUATE STUDENT COMMITTEE SERVICE**

Ar-tyan Hsu, Ph.D. completed August 1989; University of Southern California, Department of Physical Therapy; dissertation title: "Trabecular architecture and finite element analysis of the human calcaneus"

Kim O'Connor, Ph.D. completed December 1993; Department of Physical Therapy, University of Southern California; research on the effect of weight bearing on cartilage and joint function

Andrew Nelson, Ph.D. candidate; Department of Anthropology, University of California at Los Angeles; research in progress on morphology of bones of early primates

Carl Fisher, Jr. UNCC Dept. of Biology, master's candidate. Completed 8/5/96 "Effect of the insulin-like growth factors and bone morphogenetic protein on cell

division and matrix production by human intervertebral disc cells". H. Gruber, advisor and research director.

Bhaloo Desai, Ph.D. Postdoctoral trainee with my laboratory 8/95 through 3/99. Studies on human disc cells in vitro.

Committee member for Bhavini Desai, Ph.D. candidate, Dept. of Biology, U.N.C. Charlotte, 1999 – present.

B. EDITORIAL ACTIVITIES

1986-1992	Editorial Board, Society for Experimental Biology and Medicine
1989-1993	Editorial Board, Quest - Science for Health, Cedars-Sinai Medical Center Research Institute Publication
1995-1997	Editorial Board, Journal of Dental Research

C. COMMITTEES

1986-1993	Cedars-Sinai SSB Laboratory Committee
1987-1989	Cedars-Sinai Medical Center Research Committee
1988-1993	Cedars-Sinai Bioscience Library Task Force
1989-1993	Cedars-Sinai Medical Genetics Laboratory Quality of Service Committee
1990-1992	Co-chair, Fellowship Evaluation Program (Mentor Committees)
1990-1992	Chair, Medical Genetics Fellow's Journal Club
1991	Academic Consultant for Rhone-Poulenc Rorer, FDA Advisory Committee Meeting, July 23-24, 1991, Bethesda, Maryland
1992	Chair, Medical Genetics-Birth Defects Center 1991-92 Faculty Retreat, January 10, 1992
1992	Cedars-Sinai Medical Genetics Staff/Management Job Evaluation Committee
1992-1993	Associate Faculty, NIH Medical Genetics Intercampus Training Grant, UCLA
1992-1993	Strategic Planning Action Committee - Task Force on UCLA faculty retention
1998-99	Mentoring committee member for Mark Tenholder, M.D., Research Resident

1998-present	Research Review Committee, Carolinas Medical Center
1999	"Cannon 2000: a working group of biomedical research faculty", May-June, 1999.
2000	Member, Education and Research and Carolinas HealthCare Foundation Advisory Committee for the 2000 United Way campaign.

10. LECTURES AND PRESENTATIONS; INVITED PRESENTATIONS AND OTHERS 1994 - PRESENT

"Cartilage: articular and epiphyseal", Orthopaedic Surgery Basic Science Conference, February 14, 1994

"Tendon and ligament", Orthopaedic Surgery Basic Science Conference, March 14, 1994

"Effects of low maternal calcium intake on the maternal and offspring skeleton", May 2, 1994, Calcium Group Noon Meeting, School of Dentistry, University of North Carolina at Chapel Hill.

"New developments in orthopaedic surgery", panel member, Orthopaedic Surgery Basic Science Conference, May 9, 1994.

"Research studies on human intervertebral disc cells", presented to the Dept. of Biology, University of North Carolina at Charlotte, Dec. 9, 1994.

"Bone and hormones", Orthopaedic Surgery Basic Science Conference, Apr. 17, 1995.

"Bone remodelling", Orthopaedic Surgery Basic Science Conference, May 15, 1995.

"Bone development and growth", Orthopaedic Surgery Basic Science Conference, June 12, 1995.

"Cartilage and disc", Orthopaedic Surgery Basic Science Conference, October 16, 1995.

"Inflammation and infection", Orthopaedic Surgery Basic Science Conference, Jan. 15, 1996.

"Skeletal embryology, growth and remodeling", August 19, 1996, Orthopaedic Surgery Basic Science Conference.

"Skeletal dysplasias", Sept. 16, 1996, Orthopaedic Surgery Basic Science Conference

Invited keynote speaker: "Perspectives on the skeletal dysplasias", N.C. Medical Genetics Assoc. Meeting, Dec. 5, 1997.

"Peripheral nerves", Jan 12, 1998, Orthopaedic Surgery Basic Science Conference

Coordinated Orthopaedic Surgery Basic Science Conference on the skeletal dysplasias, 9/21/98

"Tissue engineering for autologous disc cell therapy". Cannon Seminar Series, 9/9/98.

"Nerves", Orthopaedic Surgery Basic Science lecture, Jan 10, 2000

"Infection and inflammation", Orthopaedic Surgery Basic Science lecture, Feb. 14, 2000

"Basic features of bone cell function in health and disease. Invited platform presentation at Medfest 2000: Continuing Medical Education Conference for Primary Care Physicians and Specialists, Blacksburg, VA, May 5-6, 2000

11. RESEARCH SUPPORT

Funded:

"Investigation of osteopenia and spontaneous fractures in an animal model", University of Southern California Faculty Research and Innovation Fund, \$11,000, 7/1/85-6/30/86

"The influence of low calcium intake on skeletal changes associated with pregnancy and lactation", National Dairy Council, \$32,680, 1/1/86-6/30/87

"Skeletal changes in offspring: Relation to maternal calcium intake and post-weaning diet", Cedars-Sinai Biomedical Research Support Grant, \$5,000, 9/1/86-8/31/87

"Purchase of a critical point dryer and sputter coater: Shared scanning electron microscopy support equipment for Pediatrics, Pathology and Nephrology", Cedars-Sinai Biomedical Research Support Grant, \$6,211, 2/87-3/88

"The skeletal dysplasias", National Institutes of Health (Co-Investigator), D. L. Rimoin, M.D., Ph.D., Principal Investigator, Years 4 and 5, 1989-1990 and 1990-1991

"Rescue and subsequent engraftment of osteogenic cells by bone marrow transplantation: Application to reversal of porcine cyclosporin or corticosteroid-induced osteopenia", Sandoz (Co-Investigator), F.R. Singer, M.D., Principal Investigator, Direct costs \$37,968, 10/1/91-9/29/92

"Assessment of the bone-forming activity of parathyroid hormone analogues", Loma Linda Veterans Association for Research and Education (Sub-contract), David Baylink, M.D. and Sandy Hilliker, Ph.D., Principal Investigators, \$6,750, 10/1/91-9/30/92

"The skeletal dysplasias", National Institutes of Health (Co-Investigator), D.L. Rimoin, M.D., Ph.D., Principal Investigator, Morphology Section, \$19,135, 5 year program project, 12/1/91-11/30/92

"Morphologic evaluation of effect of gallium on the rat osteoclast", (Principal Investigator), Fujisawa Pharmaceutical Co., \$20,000, 8/1/91-12/31/92

"Expanded histomorphometric characterization of bone biopsies from the Baylink/Chesnut calcimar osteoporosis study", (Principal Investigator), Rhone-Poulenc Rorer, \$25,000, 1/1/92-12/31/92

"Assessment of the bone-forming activity of parathyroid hormone analogues", Loma Linda Veterans Association for Research and Education (Sub-contract), David Baylink, M.D. and Sandy Hilliker, Ph.D., Principal Investigators, \$7,500, 3/15/92-3/14/93

"Polylactic acid foam efficacy in spinal fusion - a canine animal model", West Coast Spine Institute/UCLA (Sub-contract), Craig Callewart, M.D., Principal Investigator, Direct costs \$24,473, 7/1/92-12/31/93

"Rescue and subsequent engraftment of osteogenic cells by bone marrow transplantation: Application to reversal of porcine cyclosporin", Sandoz (Co-Investigator), F.R. Singer, M.D., Principal Investigator, Direct costs \$19,970, 11/1/92-4/30/93

"Studies in bone regeneration: Osteogenesis, osteoconduction, and osteoinduction", VAMC West Los Angeles (Sub-contract), T.A. Miller, M.D., Principal Investigator, Direct costs \$2,663, 8/1/92-1/31/94

"The skeletal dysplasias", National Institutes of Health Program Project (Co-Investigator), D.L. Rimoim, M.D., Ph.D., Principal Investigator, Morphology section - \$24,060, Year 7 of program project, 12/1/92-11/30/93

"The skeletal dysplasias", National Institutes of Health Program Project (Co-Investigator), D.L. Rimoim, M.D., Ph.D., Principal Investigator, Direct costs \$8,288, 12/01/93 - 11/30/94; \$8,619.

"Comparison of long term effects of surgical approaches to the acetabulum".
O.B. Tabor, Jr., M.D., principal investigator; co-investigators: M.J. Bosse, M.D., J. F. Kellam, M.D., S. H. Sims, M.D., H. E. Gruber, Ph.D. Winkler Orthopaedic Research Fund. 11/28/94 - 5/27/95; \$32,548.

"Research histology studies", summer 1995. To support research for Mr. George Manousos, a year 3-4 PreMed student at UNC-Chapel Hill. \$3700., Charlotte-Mecklenburg Health Services Foundation, Inc.

"Summer studies in the nutrient modulation of disc cell function." To support summer 1995 research activities for Sharon McDaniel, a Queen's college senior who will continue research studies on disc cell culture. \$3700. Charlotte-Mecklenburg Health Services Foundation, Inc.

"Development of soft tissue bioprosthetics". W.D. Holder, Jr., M.D., G. Sonnenfeld, Ph.D., D. H. Hayes, M.D., B. Gordon, D.V.M., P. Watterson, M.D., H. Gruber, Ph.D. (20% effort, H. Gruber). direct costs, \$1,130,000 for 1994 - 1998. CMHA Health Services Foundation (Charlotte, N.C.) and Reprogenesis Corporation (Dallas, Tx).

"Morphologic and biomechanical joint studies in a patient with extensive rheumatoid arthritis". H.E. Gruber and R. Peindl. Smith Arthritis Foundation. 2/1/95 -12/31/96. \$1,950.

"Effect of the insulin-like growth factors and bone morphogenetic protein on cell division and matrix production by human intervertebral disc cells". Charlotte-Mecklenburg Health Services Foundation, Inc. H. E. Gruber. \$12,000. 7/1/95 - 6/30/96.

"Assessment of reamer system mechanical loads and resultant histopathology as factors affecting intramedullary pressurization". R. Peindl, M. Bosse, H. Gruber, et al. Orthopaedic Trauma Association. 11/95-10/96. \$18,365.

"*In situ* PCR hybridization: Detection of the expression of the small proteoglycans". H. E. Gruber and E. N. Hanley, Jr. Charlotte-Mecklenburg Health Services Foundation, Inc., summer 1996, \$3,700.

"Utilization of the sand rat for *in vivo* and *in vitro* studies of the intervertebral disc". H. E. Gruber and E. N. Hanley, Jr. Winkler Orthopaedic Fund, \$15,000, May 1, 1996 - April 30, 1997.

"Technician support for utilization of the sand rat for *in vivo* and *in vitro* studies of the intervertebral disc"; H. E. Gruber and E. N. Hanley, Jr., Charlotte Mecklenburg Health Services Foundation, 10/1/96 - 6/30/97, \$12,251.

"Summer support for a student to work on the project 'Utilization of the sand rat (*P. obesus*) for *in vivo* and *in vitro* studies of the intervertebral disc' ", H. E. Gruber and E. N. Hanley, Jr., summer 1997, \$3700

"Development of soft tissue bioprosthesis". W.D. Holder, Jr., M.D., G. Sonnenfeld, Ph.D., D. H. Hayes, M.D., B. Gordon, D.V.M., P. Watterson, M.D., H. Gruber, Ph.D. (20% effort, H. Gruber). \$526,000 extension through Dec. 1999. CMHA Health Services Foundation (Charlotte, N.C.) and Reprogenesis Corporation (Dallas, Tx).

"Cytosensor Microphysiometer equipment grant for studies of the human intervertebral disc cell in vitro", H. E. Gruber, Molecular Devices Corporation, \$29,750, 3/19/97

"Utilization of the sand rat for *in vivo* and *in vitro* studies of the intervertebral disc". H. E. Gruber and E. N. Hanley, Jr. Winkler Orthopaedic Fund, \$15,000, May 1, 1997 - April 30, 1998.

"Autologous disc cell transplantation in the sand rat (*Psammomys obesus*).". H.E. Gruber and E. N. Hanley, Jr.: (Graduate student project). Charlotte Mecklenburg Health Services Foundation, Inc. \$12,000 for one year. Funded on 6/17/97

"Characterization of sulfate metabolism and programmed cell death in human disc cells in vitro", H.E. Gruber, E. N. Hanley, Jr. and B. J. Desai. \$50,000, North American Spine Society; 1/1/98- 12/31/98

"Tissue engineering for autologous disc cell therapy in a small animal model." H. E. Gruber, and E. N. Hanley, Jr., \$95,000, National Medical Technology Testbed, 1 year beginning 11/15/97

"Programmed cell death and sulfate metabolism in cervical and lumbar human intervertebral discs". H.E. Gruber and E. N. Hanley, Jr. \$30,000, Cervical Spine Research Society. 1/1/98 - 12/31/98

"Implantation methodologies for autologous disc cell therapy". Alpha Omega Alpha Honor Medical Society - funded Student Research Fellowship for David Martin; Gruber lab is host lab; supply money: \$500 in addition to stipend to David. Summer, 1998

"Confocal microscope for the Cannon Research Center". \$250,000. N.C. Biotechnology Center. Awarded 6/15/98. C. Halberstadt, K. Burg, and H.E. Gruber

"Development of a bone cement implant for drug delivery". Fumio Tokita, W.K. Ramp, H.E. Gruber, R.D. Peindl: Charlotte-Mecklenburg Health Services Fdn., \$17,100. 7/1/98 - 6/30/99.

"Support of a breeding colony and adult colony of sand rats (*Psammomys obesus*) for studies of disc degeneration". H.E. Gruber. \$30,000. Charlotte-Mecklenburg Health Services Foundation. 9/1/98 - 8/31/00.

"Programmed cell death and sulfate metabolism in cervical and lumbar human intervertebral discs." H.E. Gruber and E. N. Hanley. The Cervical Spine Research Society. Year 2 competitive renewal. \$30,000 (which includes \$4,500 indirect costs). 1/1/99 - 12/31/99.

"Tissue engineering for autologous disc cell therapy in a small animal model." Year 2 competitive renewal. H.E. Gruber. National Medical Technology Testbed. \$86,786. (15% indirect costs) 4/22/99 - 4/21/00.

"Tissue engineering for the intervertebral disc with the sand rat model". H.E. Gruber and E.N. Hanley, North American Spine Society. 1/1/00 -12/31/00. \$42,830.

"Factors associated with physeal fracture healing and physeal bar formation", M. Wattenbarger, R. Meyer, H.E. Gruber, A. Marshall, Health Services Foundation, \$15,249. 9/1/00-8/31/01

"In vivo response to cross-linked polyethylene using a rat model". A. Marshall, H. Gruber, R. Meyer, T. Fehring. Winkler Orthopaedic Fellowship. \$16,982. 2001

"Human intervertebral disc cell attachment, proliferation and matrix production in vitro: Experimental studies with selected cell carriers for tissue engineering". H.E. Gruber, E.N. Hanley, Jr. North American Spine Society. 1/1/01 –12/31/01. \$50,000.

12. Patents:

"Method for producing human intervertebral disc cells". E.N. Hanley, Jr., and H.E. Gruber. Patent No. 6,080,579. Issue date June 27, 2000.

13. BIBLIOGRAPHY

A. SCIENTIFIC ARTICLES IN PRINT (REFEREED)

1. 1974 **Gruber, H.E.**, Rosario, B.: "Variation in eyespot ultrastructure in Chlamydomonas reinhardi (ac-31)." J. Cell Sci. **15**:481-491
2. 1976 **Gruber, H.E.**, Nachtwey, D.S.: "Cell cycle dependent X-ray induced death in Chlamydomonas reinhardi." Radiat. Res. **66**:288-302
3. 1976 **Gruber, H.E.**, Nachtwey, D.S.: "X-ray induced division delay in Chlamydomonas reinhardi." Radiat. Res. **66**:303-309
4. 1977 **Gruber, H.E.**, Rosario, B.: "Ultrastructural variations in the flagellar apparatus of Chlamydomonas reinhardi (ac-31)." J. Submicrosc. Cytol. **9**:103-113
5. 1978 **Gruber, H.E.**: "X-ray and proton-induced ultrastructural changes in dividing Chlamydomonas reinhardi." Radiat. Res. **73**:137-159
6. 1978 Oberley, L.W., Bize, I., Sahu, S., Leuthauser, S., **Gruber, H.E.**: "Superoxide dismutase activity of normal murine liver, regenerating liver, and H6 hepatoma." J. Natl. Cancer Inst. **61**:375-379
7. 1979 **Gruber, H.E.**, Rosario, B.: "Ultrastructure of the Golgi apparatus and contractile vacuole of Chlamydomonas reinhardi." Cytologia **44**:505-526
8. 1979 **Gruber, H.E.**, Osborne, J.W.: "Ultrastructural features of hexamitiasis in X-irradiated rat small intestine." Lab. Anim. **13**:199-202
9. 1980 Tewfik, H.H., **Gruber, H.E.**, Tewfik, F.A., Lifshitz, S.G.: "Intraperitoneal distribution of ³²P-chromic phosphate suspension in the dog." Int. J. Radiat. Oncol. Biol. Phys. **5**:1907-1913
10. 1980 **Gruber, H.E.**, Tewfik, H.H., Tewfik, F.A.: "Cytoarchitecture of Ehrlich ascites carcinoma implanted in the hind limb of ascorbic-acid supplemented mice." Eur. J. Cancer **16**:441-448
11. 1980 **Gruber, H.E.**, Schedl, H., Osborne, J.W.: "Alterations in islet cell ultrastructure following streptozotocin-induced diabetes in the rat." Acta Diabetol. Lat. **17**:213-223
12. 1981 **Gruber, H.E.**, Stauffer, M., Thompson, E., Baylink, D.J.: "Diagnosis of bone disease by core biopsies." Semin. Hematol. **18**:258-278

13. 1981 **Gruber, H.E.**, Baylink, D.J.: "The diagnosis of osteoporosis." J. Am. Geriatr. Soc. 29:490-497
14. 1982 Manzke, E., **Gruber, H.E.**, Hiness, R.W., Baylink, D.J.: "Skeletal remodelling and bone related hormones in two adults with increased bone mass." Metabolism 31:25-32
15. 1982 Manzke, E., **Gruber, H.**, Hiness, R., Baylink, D.: "Osteopetrose: Unterschiedliche rontgenologische, morphologische, morphokinetische und biochemische Befunde bei zwei Erwachsenen mit Osteopetrose." Radiologe 22:175-180
16. 1982 Manzke, E., **Gruber, H.**, Hiness, R., Baylink, D.: "Osteopetrose: Unterschiedliche rontgenologische, morphologische, morphokinetische und biochemische Befunde bei zwei Erwachsenen." Therapiewoche 32:3630-3632
17. 1982 Liu, C., Rader, J., **Gruber, H.**, Baylink, D.: "Acute reduction in osteoclast number during bone repletion." Metab. Bone Dis. Relat. Res. 4:201-209
18. 1982 **Gruber, H.E.**, Rosario, B., Hampton, J.C.: "Ultrastructural alterations following X-ray and proton irradiation of dividing Chlamydomonas reinhardtii." Scanning Electron Microsc. 1982:323-333
19. 1983 Chesnut, C.H. III, Ivey, J.L., **Gruber, H.E.**, Matthews, M., Nelp, W., Sisom, K., Baylink, D.J.: "Stanozolol in postmenopausal osteoporosis: therapeutic efficacy, and possible mechanisms of action." Metabolism 32:571-580
20. 1984 **Gruber, H.E.**, Ivey, J.L., Baylink, D.J., et al.: "Long-term calcitonin therapy in postmenopausal osteoporosis." Metabolism 33:295-303
21. 1984 **Gruber, H.E.**, Gutteridge, D., Baylink, D.J.: "Osteoporosis associated with pregnancy and lactation: Bone biopsy and skeletal features in three patients." Metab. Bone Dis. Rel. Res. 5:159-165
22. 1984 **Gruber, H.E.**, Brautbar, N.: "Metabolic bone disease and the elderly: current approach to diagnosis and therapy." Nephron 38:76-86
23. 1984 **Gruber, H.E.**, Marshall, G.J., Kirchen, M.E., Brown, Wm., Kang, J.H., Massry, S.G.: "Quantitative bone histology of osteogenesis imperfecta: Comparison of types I and IV and identification of a low fibrosis subgroup." Orthopaedic Transactions 8:290-291
24. 1984 Sweeney, J.R., Marshall, G.J., **Gruber, H.E.**, Kirchen, M.E.: "Effects of non-weight bearing on fracture healing." The Physiologist 27(suppl.): S35-36
25. 1985 **Gruber, H.E.**, Marshall, G.J., Kirchen, M.E., et al.: "Improvements in dehydration and cement line staining for methacrylate-embedded human bone biopsies." Stain Technol. 60:337-344
26. 1986 **Gruber, H.E.**, Ivey, J.L., Thompson, E.R., Chesnut, C.H. III, Baylink, D.J.: "Osteoblast and osteoclast cell number and cell activity in postmenopausal osteoporosis." Miner. Electrolyte Metab. 12:246-254
27. 1986 Brautbar, N., **Gruber, H.E.**: "Magnesium and bone disease." Nephron 44:1-7

28. 1987 **Gruber, H.E.,** Marshall, G.J., Moore, T.M., Schwinn, C.P., Kirchen, M.E., et al.: "Alteration in osteoblast cell number and cell activity in the presence of invading malignant fibrous histiocytoma." Cancer 59:755-760
29. 1987 **Gruber, H.E.,** Singer, F.R.: "The spectrum of pathology in osteomalacia." Appl. Pathol. 5:160-171
30. 1988 Greenberg, C.R., Rimoin, D.L., **Gruber, H.E.,** DeSa, D.J.B., Reed, M., Lachman, R.S.: "A new autosomal recessive lethal chondrodystrophy with congenital hydrops." Am. J. Med. Genet. 29:623-632
31. 1988 **Gruber, H.E.,** Marshall, G.J., Nolasco, L.M., Kirchen, M.E., Rimoin, D.L.: "Alkaline and acid phosphatase demonstration in human bone and cartilage: Effects of fixation intervals and methacrylate embedments." Stain Technology 63:299-306
32. 1989 **Gruber, H.E.,** Rimoin, D.L.: "Quantitative histology of cartilage cell columns in the human costochondral junction: Findings in newborn and pediatric subjects." Pediatr. Res. 25:202-204
33. 1989 Shohat, M., Lachman, R., **Gruber, H.E.,** Rimoin, D.L.: "Brachyolmia: Radiographic and genetic evidence of heterogeneity." Am. J. Med. Genet. 33:209-219
34. 1990 **Gruber, H.E.,** Greenberg, C., Lachman, R.S., Rimoin, D.L.: "Ultrastructural abnormalities in bone and calcifying cartilage in two siblings with a newly described recessive lethal chondrodysplasia." Ultrastruct. Pathol. 14:343-355
35. 1990 Shohat, M., **Gruber, H.E.,** Pagon, R.A., Witcoff, L.J., Lachman, R., Ferry, D., Flaum, E., Rimoin, D.L.: "Geleophysic dysplasia: A storage disorder affecting the skin, bone, liver, heart and trachea." J. Pediatr. 117:227-232
36. 1990 **Gruber, H.E.,** Lachman, R.S., Rimoin, D.L.: "Calcospherite size in the short rib polydactyly syndromes." Scanning Microsc. Int. 4:775-780
37. 1990 Frydman, M., Bar-Ziv, J., Preminger-Shapiro, R., Brezner, A., Brand, N., Ben-Ami, T., Lachman, R.S., **Gruber, H.E.,** Rimoin, D.L.: "Possible heterogeneity in spondyloenchondrodysplasia: Quadriparesis, basal ganglia calcifications, and chondrocyte inclusions." Am. J. Med. Genet. 36:279-284
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- 1990 Lachman, R., **Gruber, H.E.**, Rimoin, D.L.: "Radiologic-pathologic correlation in hydrops - motheaten skeletal dysplasia: A new autosomal recessive lethal skeletal dysplasia." International Skeletal Society, Salzburg, Austria, September 1990
- 1990 Marshall, G.J., Fras, I.A., Kirchen, M.E., **Gruber, H.E.**, Sweeney, J.R., Stover, S.J.: "Effects of microgravity on aging in the house fly." American Society of Gravitational and Space Biology Bulletin **4**(1):26
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- 1991 **Gruber, H.E.**: "Contributions of quantitative histomorphometry to the clinical evaluation of chondro-osseous tissue." Platform presentation, 8th International Congress for Stereology, University of California, Irvine, August 25-30, 1991
- 1991 **Gruber, H.E.**, Sharp, C.F., Jr., Stover, S.: "Densitometric evidence for a metabolic memory for mineral metabolism in the rat." J. Bone Miner. Res. **6** (Suppl. 1):S220
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proliferation. Platform presentation, Nov. 1995, Transactions of the 2nd Combined Meeting of the Orthopaedic Research Societies, p. 34.

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- 1995 Holder, W.D.Jr., **Gruber, H.E.**, Moore, A.L., et al: Cellular ingrowth into poly(L-lactic) acid and poly(glycolic) acid matrices in the rat. Jan. 1996 Keystone Symposia.
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- 1996 **Gruber, H.E.**, Hanley, E.N. Jr.: Younger may not be better: Disc cell responsiveness *in vitro*. Poster presented at the 109th annual meeting of the American Orthopaedic Association, Colorado Springs, June 8-11.
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- 1997 Banks, D., **Gruber, H.**, Martin, D. et al: Vertebral disc cell extraction and culture using a small animal model: A feasibility study. *Southern Medical Association*, poster for Nov. meeting
- 1998 Pfeiffer, L.S., Wattenbarger, M., Meyer, R., **Gruber, H.**, Easley, M.: Effect of interposed periosteum in an animal physeal fracture model. *Residents' Day Research Presentations*, Dept. of Orthopaedic Surgery, May 15, 1998.

- 1998 **Gruber, H.E.**, Hoelscher, G., Desai, B., Hanley, E.N. Jr.: Human intervertebral disc cells in three-dimensional culture. Poster presentation at the First Southeastern US Tissue Engineering Conference, June 5, Research Triangle Park, N.C.
- 1998 **Gruber, H.E.**, Hanley, E.N. Jr.: Ultrastructural characteristics of cells and extracellular matrix of the human intervertebral disc during aging and degeneration: comparison of surgical specimens with controls. Platform presentation, Ultrathin IX, Asheville, Aug, 1998.
- 1998 Loebbeck, A.B., Halberstadt, C.R., Holder, W.D. Jr., **Gruber, H.E.**, Culbertson, C.R., Greene, K.G., Roland, W.D., Burg, K.J.L.: The development of an embedding technique for polylactide sponges. Platform presentation, annual 1998 meeting of the Society for Biomaterials.
- 1998 **Gruber, H.E.**, Fisher, E.C. Jr., Hoelscher, G., Hanley, E. N. Jr.: Disc degeneration and aging: morphologic changes correlate with poor proliferative responses to IGF-1 by human cells grown in vitro in agarose culture. Orthopaedic Research Society, 44th annual meeting, poster, 3/17/98.
- 1998 Phieffer, L.S., Wattenbarger, M., Meyer, R., **Gruber, H.**, Easley, M.: Effect of interposed periosteum in an animal physeal fracture model. Residents' Day Research Presentations, Dept. of Orthopaedic Surgery, May 15, 1998.
- 1998 Gutteridge, D.H., **Gruber, H.E.**, Kermode, D.G., Worth, G.K.: Paget's disease with primary hyperparathyroidism - sex distribution in 30 cases; prediction of skeletal response to parathyroidectomy in 18. National Association for the Relief of Paget's Disease, International Symposium, Oxford, 7/98.
- 1998 **Gruber, H.E.**, Hoelscher, G.L., Grigsby, J., G. Coldham, Hanley, E.N. Jr.: Toxic effects of antibiotics on human disc cells in vitro. North American Spine Society, Oct. 1998 meeting. Platform presentation.
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- 1998 Phieffer, L.S., Wattenbarger, J.M., Meyer, R.A., **Gruber, H.E.**, Easley, M.: Physeal fracture with interposed periosteum: Bone growth and histology in an animal model. Amer. Acad. Orthopaedic Surgeons, Feb., 1999.
- 1998 **Gruber, H.E.**, Puzanov, I., Bennett, M., Kumar, V., Gordon, B.: Ablation of natural killer 1.1 cells blocks osteoclastic resorption in vivo. J. Bone Mineral Res. 23(5) (suppl), #T111, p. S229, 1998.
- 1999 **Gruber, H.E.**, Hanley, E.N.: Human intervertebral disc cells: Differences in collagen and proteoglycan production in monolayer vs three-dimensional culture. 45th annual meeting of the Orthopaedic Research Society, Feb., 1999. Poster presentation. Trans. O.R.S., p 1034.
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- 1999 **H.E. Gruber**, E.N. Hanley: Human intervertebral disc cells: Differences in collagen and proteoglycan production in monolayer vs three-dimensional culture. , Jr. July 10, 1999. The Third North Carolina Tissue Engineering Group Meeting, Charlotte, N.C.
- 1999 Gutteridge, D.H., **Gruber, H.E.**, Kermode, D.G., Worth, G.K.: Paget's disease with primary hyperparathyroidism: Gender distribution in 30 cases, and prediction of skeletal response to parathyroidectomy in 18. Bone. 24 (no. 5, suppl): 51S.
- 1999 G. Coldham, E.N. Hanley, **H. Gruber**, K. Leslie. The effect of chondroitin sulphate on cultured human disc cells. CMC Dept. of Orthopaedic Surgery Annual Resident's Visiting Professor Program, May 13, 1999.
- 1999 J. Meek, **H.E. Gruber**, B.E. Gordon, P.B. Marshburn. The effect of GnRH analogue pretreatment along with oxidized regenerated cellulose (Interceed) upon post-surgical adhesion formation in the rabbit.Spring Symposium, CMC, May, 1999
- 1999 **Gruber, H.E.**, Coleman, S.S., Hanley, E.N.Jr. Anti-apoptotic effects of cytokines on human intervertebral disc cells in vitro. Poster presentation, International Society for the Study of the Lumbar Spine, Hawaii, June 21-25, 1999.
- 1999 **Gruber, H.E.**, Hanley, E.N. Jr.: Rescue of human disc cells from apoptosis. Platform presentation, Cervical Spine Research Society, December, 1999, Seattle
- 1999 **Gruber, H.E.**, Coleman, S.S., Hanley, E.N.Jr.: In vitro rescue of human disc cells from apoptosis. Platform presentation, North American Spine Society, Oct., 1999, Chicago
- 2000 **H.E. Gruber** and E.N. Hanley. Heterogeneity in 35-S-uptake by human intervertebral disc cells in vitro. Platform presentation, Internatl. Soc. for the Study of the Lumbar Spine, April 2000 meeting.
- 2000 **H.E. Gruber** and E.N. Hanley. In vitro rescue of human disc cells from apoptosis by IGF-1 and PDGF. Poster presentation, ORS, March, 2000.
- 2000 **H.E. Gruber** and J.A. Ingram: Invited speaker at the North Carolina Society of Histopathology Technologists, March 31, 2000: Practical approaches to bone and cartilage histology
- 2000 J. Meek, **H. Gruber**, B. Gordon, P. Marshburn: The effect of GnRH analogue pretreatment along with oxidized regenerated cellulose (Interceed) upon post-surgical adhesion formation in the rabbit. Platform presentation at the 26th Scientific Meeting of the Society of Gynecologic Surgeons, Feb. 29, 2000, New Orleans.
- 2000 **H.E. Gruber**, S. Coleman, E.N. Hanley, Jr.: Anti-apoptotic effects of cytokines on human intervertebral disc cells in vitro. Poster presentation at the April 7, 2000 N.C. Tissue Engineering Interest Group meeting. Research Triangle Park.
- 2000 **H.E. Gruber**, E.N. Hanley, Jr.: Selective in vitro attachment patterns are used by human disc cells from the annulus in response to different culture microenvironments. Platform presentation, Cervical Spine Research Society, 11/30/2000, Charleston, S.C.

- 2001 **H.E. Gruber** and E.N. Hanley, Jr.: Cell shape modulates differential proliferative potentials in human intervertebral disc cells in vitro. Poster presentation, Amer. Acad. Orthopaedic Surgeons, 68th annual meeting, San Francisco, Feb 28-Mar 4, 2001
- 2001 JM Wattenbarger, L. Phieffer, **H.Gruber**: Histologic features of physeal bar formation in physeal fractures. POSNA, May, 2001 meeting. Received Best Poster award.
- 2001 J.M. Wattenbarger, L. Phieffer, **H. Gruber**: Histologic features of physeal bar formation in physeal fractures. Growth Plate Conference, June, 2001.
- 2001 J.M. Wattenbarger, L. Phieffer, R.Meyer, **H.E. Gruber**: Histologic features of physeal bar formation in physeal fractures. Podium presentation, Amer. Acad. Orthopaedic Surgeons, 68th annual meeting, San Francisco, Feb 28-Mar 4, 2001
- 2001 Rude, R.K., **Gruber, H.E.**, Wei, L.Y., Frausto, A., Mills, B.G.: Magnesium deficiency: Effect on bone and mineral metabolism in the mouse. Poster presentation, Amer. Soc. For Bone and Mineral Research annual meeting, Phoenix, AZ.

F. MISCELLANEOUS ARTICLES AND PUBLICATIONS

- 1972 King, Keith I., Pribble, H.J., **Gruber, H.E.**: "The pond as a unit of study." Laboratory manual utilized in GS 101, General Biology, Department of General Science, Oregon State University, 1972
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